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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09 636,308	08 11 2000	Timothy A. Okel	1527A2	7905

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PPG INDUSTRIES INC  
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EXAMINER

BLANTON, REBECCA A

ART UNIT	PAPER NUMBER
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1762

DATE MAILED: 11 22 2002

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Please find below and/or attached an Office communication concerning this application or proceeding.

Application No.

Applicant(s)

09/636 308

OKE ET AL

Office Action Summary

Examiner

Art Unit

Rebecca A. Blanton

1762

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be filed later than SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. (See 37 CFR 1.704(b)).

Status

- 1) ☒ Responsive to communication(s) filed on 16 September 2002
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution under this application is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 215.

Disposition of Claims

- 4) ☒ Claim(s) 1-18 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-3, 5-8, 10-12, 14-16 and 18 is/are rejected.
- 7) ☒ Claim(s) 4, 9, 13 and 17 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. (See 37 CFR 1.85(a)).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved. If disapproved, the Examiner will require a further correction.  
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f):  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1 ☐ Certified copies of the priority documents have been received.  
2 ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_  
3 ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application):  
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTC-1449) Paper No(s) \_\_\_\_\_
- 4) ☐ Interview Summary, PTO-413, Paper No(s) \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-900)
- 6) ☐ Other \_\_\_\_\_

## DETAILED ACTION

### ***Claim Rejections - 35 USC § 103***

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

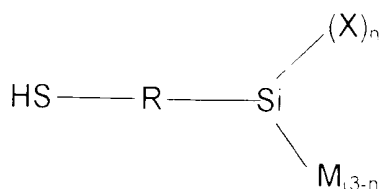
Claims 1-3, 5-8, 10-12, 14-16, and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wagner (U.S. 4,436,847) in view of Burns et al. (U.S. 6,051,672).

Referring to claim 1, Wagner discloses a reinforcing silica particle and a coupling solution used to treat the silica particle to improve the performance of the silica particles (column 1 lines 31-45). Wager teaches that the coupling mixture used to treat the silica particles comprises bis(alkoxysilylalkyl)polysulfides, haloalkylsilanes, and silane compounds, such as alkyl alkoxysilane (abstract). In column 6 lines 1-4, the reference teaches that the weight ratio of bis(alkoxysilylalkyl)polysulfide to alkoxysilane ranges between 0.15:1 to 15:1. However, Wagner does not disclose the pH at which the coupling solution is contacted with the silica particles. Burns et al. disclose a method for making hydrophobic silica particles in an aqueous solution (abstract). In column 4 lines 24-46, Burns et al. teach that the organosilica compounds used to treat the silica particles include the bis(alkoxysilylalkyl)polysulfide, bis(triethoxysilylpropyl)tetrasulfide and the haloalkylsilane, trimethylchlorosilane. Burns et al. further disclose that the pH is within the range of 0 to 3.5 (column 5 lines 20-22). It would have been obvious to one of ordinary skill in the art at the time the invention was made to look to prior art for a proper pH at which to contact the coupling solution, taught by Wagner, to the silica

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particle, and use a pH less than 3.5, in view of the teachings of Burns et al. Neither Wagner nor Burns et al. teach raising the pH from between 3 and 10 after the solution has been contacted with the particles. However, Burns et al. teach that pH is a known result effective variable (column 5 lines 20-40). If the pH is too low or too high the modified particles may become unstable and deteriorate. Additionally, Burns et al. teach if the pH is too low the particles will agglomerate (column 5 lines 61-65). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to adjust the pH to an appropriate range to ensure that the modified silica filler particles remained intact.

Referring to claims 2-3, in column 2 lines 1-39, Wagner discloses the use of a mercaptosilane represented by the formula:



Where X represents a halogen or  $-\text{OR}$ ; M is a hydrogen,  $\text{C}_1$ - $\text{C}_{10}$  alkyl, or halosubstituted  $\text{C}_1$ - $\text{C}_{10}$  alkyl; R is a  $\text{C}_1$ - $\text{C}_4$  alkylene; R<sup>1</sup> is selected from  $\text{C}_1$ - $\text{C}_{10}$  alkyl or alkoxyalkyl containing 2-10 carbon atoms, and n is 1, 2, or 3.

Referring to claim 5, Wagner discloses that mercaptotrimetxysilane and mercaptopropyltrimethoxysilane, as well as other mercaptosilanes, may be used as the coupling agent (column 2 lines 34-39).

Referring to claims 6-8, Wagner discloses that the alkoxysilane may be methyltrimethoxysilane or methyltriethoxysilane, in addition to other alkoxysilanes (column 2 lines 40-45).

Referring to claims 10-11, Wagner teaches, in column 6 lines 1-4 that the weight ratio of bis(alkoxysilylalkyl)polysulfide to alkoxysilane ranges between 0.15:1 to 15:1.

Referring to claim 12, Wagner teaches that both mercaptosilanes and bis(alkoxysilylalkyl)polysulfides may be used as the coupling agent (column 2 lines 1-58). However, Wagner does not teach the use of both the mercaptosilane and bis(alkoxysilylalkyl)polysulfide together. Burns et al. teach, in column 4 lines 24-46, that a mixture of two or more organosilica compounds, such as mercaptopropylmethyldimethoxysilane and bis(triethoxysilylpropyl)tetrasulfide, may be used in the coupling composition. Additionally, Burns et al. teach that the mercaptosilane or the bis(alkoxysilylalkyl)polysulfide may be used alone in the coupling composition (column 4 lines 24-46). It would have been obvious to one of ordinary skill in the art at the time the invention was made to use both a mercaptosilane and a bis(alkoxysilylalkyl)polysulfide together in the coupling composition taught by Wagner in view of the teachings of Burns et al. that using a mixture of the two compounds is equivalent to only using one of the compounds.

Referring to claims 14-15, Wagner teaches, in column 5 lines 7-18, that the bis(alkoxysilylalkyl)polysulfides that are useful in the invention include 3,3'-bis(trimethoxysilylpropyl)tetrasulfide and 3,3'-bis(triethoxysilylpropyl)tetrasulfide.

Referring to claims 16 and 18, Wagner teaches producing a modified silica filler product by contacting a silica particle with a coupling solution as described above (column 1 lines 12-68).

Claims 4 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wagner (U.S. 4,436,847) in view of Burns et al. (U.S. 6,051,672) as applied to claim 2 above, and further in view of Cruse et al. (WO 99/09036)

Referring to claim 4, Wagner discloses a process for forming modified silica particles by contacting silica particles with a coupling solution that contains mercaptosilanes, as described above. Burns et al. also disclose a process for forming modified silica particles, described above. However, neither reference discloses the use of blocked mercaptosilanes in the coupling solution. Cruse et al. teach the use of blocked mercaptosilanes as coupling agents (abstract). On page 1 lines 1-20, Cruse et al. disclose that the mercaptosilanes are blocked until they are needed for use to reduce their reactivity to prevent premature curing. When the mercaptosilanes are needed, Cruse et al. teach that they are unblocked using a deblocking agent (page 3 lines 6-14). It would have been obvious to one of ordinary skill in the art at the time the invention was made to use blocked mercaptosilanes in the coupling solution taught by Wagner, to ensure that they do not prematurely react and cause untimely curing.

Referring to claim 17, Wagner teaches producing a modified silica filler product by contacting a silica particle with a coupling solution (column 1 lines 12-68)

Claims 9 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over

Wagner (U.S. 4,436,847) in view of Burns et al. (U.S. 6,051,672) as applied to claims 6 and 12 above, and further in view of Lightsey et al. (U.S. 5,985,953)

Referring to claims 9 and 13, Wagner discloses a method for forming modified silica filler by contacting silica particles with a coupling solution, as described above. Additionally, Wagner discloses the use of chloromethyl trimethoxysilane as a halosubstituted alkyl silane (column 5 lines 19-36). Burns et al. also describes forming modified silica filler particles by contacting them with a coupling solution, explained above. However, neither reference teaches using precipitated silica particles to form the modified silica. Lightsey et al. teach forming a modified silica by reacting precipitated silica particles with an organosilica coupling agent in an aqueous solution (abstract). The coupling agents taught by Lightsey et al. include bis(triethoxythiopropyl)tetrasulfide and mercaptopropyltriethoxysilane (column 7 lines 33-50). The reference further teaches that alkoxysilanes may be used in the coupling solution (column 6 lines 54-67). It would have been obvious to one of ordinary skill in the art at the time the invention was made to use precipitated silica in the method of forming modified silica by contacting silica particles with a coupling solution, as taught by Wagner, in view of the teaching of Lightsey et al. that precipitated silica may be used to form modified silica particles when contacted with a coupling solution.

Referring to claim 13, neither Wagner nor Burns et al. disclose a weight ratio of bis(alkoxysilylalkyl)polysulfide to mercaptosilane. However, the weight ratio is a known result effective variable. If the ratio is too high, only the bis(alkoxysilylalkyl)polysulfide may bond to the silica particles, however, if the weight ratio is too low, only the

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mercaptosilane may bond to the silica particles. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to experimentally determine the optimum weight ratio for bonding of the bis(alkoxysilylalkyl)polysulfides and the mercaptosilanes to the silica particles.

### ***Response to Arguments***

Applicant's arguments filed 09/16/02 have been fully considered but they are not persuasive.

The applicant argues that Wagner et al. (U.S. 4,436,847) does not specify the starting pH of the solution, nor does the reference disclose adjusting the pH of the reaction mixture. However, Wagner et al. discloses a process for reinforcing silica particle and a coupling solution used to treat the silica particle to improve the performance of the silica particles. Wager teaches that the coupling mixture used to treat the silica particles comprises bis(alkoxysilylalkyl)polysulfides, haloalkylsilanes, and silane compounds, such as alkyl alkoxysilane. Wagner makes no mention of the pH of the reaction solution. However, Burns et al. (U.S. 6,051,672) discloses a process for treating silica particles with organosilica compounds, such as bis(alkoxysilylalkyl)polysulfide, bis(triethoxysilylpropyl)tetrasulfide, and the haloalkylsilane, trimethylchlorosilane. Burns et al. teach that the reaction between the coating solution and the particles takes place at a pH within a range of 0 to 3.5. Following the coating process, Burns et al. teach that the pH is raised by the addition of a base so as to prevent the particles from agglomerating. Burns et al. do not specifically teach the pH to which the particles are raised, however, this is a known



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result effective variable. Burns et al. teach if the pH is too low the particles will agglomerate, however, if the pH is too high the particles may become unstable and deteriorate. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to react the coating solution of bis(alkoxysilylalkyl)polysulfides, haloalkylsilanes, and silane compounds with the silica particles at a pH of less than 3.5 so as to form a reinforced coating upon the particles as taught by Wagner et al. and then raise the pH of the solution following the coating process in view of the teachings of Burns et al. that the reaction of bis(alkoxysilylalkyl)polysulfides and haloalkylsilanes compounds to form a coating upon silica particles takes place at a optimum pH of less than 3.5 and the pH of the solution should be raised following the reaction to prevent the particles from agglomerating.

The examiner agrees with the applicant regarding the applicant's arguments drawn towards the double patenting rejection. The applicant argues that the coupling agent in the present application is a bis(alkylsilylalkyl)polysulfide and a non-sulfur organometallic compound, while the coupling agent of copending application no 09/636,308 is a mercaptoorganometallic compound and a non-sulfur organometallic compound. As bis(alkylsilylalkyl)polysulfide is not a mercaptoorganometallic compound and none of the prior art of record teach or fairly suggests that a mercaptoorganometallic compound is equivalent to a bis(alkylsilylalkyl)polysulfide compound as a coupling agent, the double patenting rejection is withdrawn.

### ***Conclusion***

**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Rebecca A. Blanton whose telephone number is 703-605-4295. The examiner can normally be reached on M - F (7:30am - 3:30pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Shrive P. Beck can be reached on 703-308-2333. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9310 for regular communications and 703-872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0661.

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November 18, 2002

A handwritten signature, possibly reading "032", followed by a horizontal line.